

We claim:

1. A process for preparing polytetrahydrofuran, polytetrahydrofuran copolymer, diester or monoester by polymerizing tetrahydrofuran in the presence of at least one telogen and/or comonomer and of an acidic heterogeneous catalyst based on activated sheet silicates or mixed metal oxides in a fluidized bed.
2. A process as claimed in claim 1, wherein the expansion factor of the catalyst bed is ≤ 1.15 ; preferably < 1.10 and more preferably < 1.05 .
3. A process as claimed in claim 1, wherein the expansion factor of the catalyst bed is from 1.01 to 4; preferably from 1.05 to 2, more preferably from 1.1 to 1.5.
4. A process as claimed in any of claims 1 to 3, wherein the catalyst used comprises at least one oxide from the group of SiO_2 , TiO_2 and/or ZrO_2 , and is more preferably based on acid-activated montmorillonite, $\text{Al}_2\text{O}_3/\text{SiO}_2$, $\text{ZrO}_2/\text{SiO}_2$, WO_x/TiO_2 or WO_x/ZrO_2 , in particular on acid-activated montmorillonite, or on $\text{Al}_2\text{O}_3/\text{SiO}_2$, $\text{ZrO}_2/\text{SiO}_2$.
5. A process as claimed in any of claims 1 to 4, wherein the catalyst used has a pycnometric density of from 1.5 to 10 g/cm^3 , preferably from 2 to 7 g/cm^3 , in particular from 2 to 4 g/cm^3 .
6. A process as claimed in any of claims 1 to 5, wherein the porosity of the catalyst is from 0.05 to 5 cm^3/g , preferably from 0.1 to 2 cm^3/g , more preferably from 0.2 to 1.5 cm^3/g .
7. A process as claimed in any of claims 1 to 6, wherein the individual catalyst particles have a volume of from 500 μm^3 to 5 cm^3 , preferably from 0.0005 mm^3 to 1000 mm^3 , more preferably from 0.01 to 100 mm^3 , in particular from 0.1 to 30 mm^3 .
8. A process as claimed in any of claims 1 to 7, wherein the bed density of the catalyst is from 250 to 2500 g/l , preferably from 400 to 2000 g/l .
9. A process as claimed in any of claims 1 to 8, wherein the reactor is flowed through from bottom to top.

10. A process as claimed in any of claims 1 to 9, wherein the catalyst or portions of the catalyst volume are withdrawn from and/or fed to the polymerization reactor continuously, at regular intervals or batchwise, without the reactor being emptied and/or the polymerization reaction being interrupted for this purpose.
- 5
11. A process as claimed in any of claims 1 to 10, wherein tetrahydrofuran is polymerized in the presence of carboxylic anhydride, preferably acetic anhydride, to give polytetrahydrofuran or derivatives and copolymers thereof having molecular weights of from 250 to 10 000 dalton, preferably from 500 to 5 000 dalton, in particular from 650 to 4 000 dalton.
- 10
12. A process as claimed in any of claims 1 to 11, wherein the reactor is operated in circulation and the ratio of circulation to feed is less than or equal to 200/1, preferably from 1/1 to 150/1, in particular from 5/1 to 100/1.
- 15
13. A process as claimed in any of claims 1 to 12, wherein the catalyst hourly space velocity is from 0.01 to 3.0 kg of THF/kg of catalyst * h, preferably from 0.02 to 1.5 kg of THF/kg of catalyst * h and more preferably from 0.04 to 0.75 kg THF/kg of catalyst * h.
- 20
14. A process as claimed in any of claims 1 to 12, wherein the superficial velocity is from 0.1 to 200 m³/m²*h, preferably from 0.5 to 100 m³/m²*h.